ACERIA FICUS (COTTE) AND *RHYNCAPHYTOPTUS FICIFOLIAE* KEIFER (ACARI: ERIOPHYOIDEA) FIRST RECORDS IN THE BRITISH ISLES

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Abstract. Between July and October of 2000 the eriophyid mites *Aceria ficus* and *Rhyncaphytoptus ficifoliae* were discovered in the British Isles for the first time. Live specimens of both species were collected from the leaves of fig, *Ficus carica* L. *Aceria ficus* was found at a location in Cheshire and *R. ficifoliae* was collected from a nursery in West Sussex.

Introduction

On the 21.vii.2000 four leaves of *Ficus carica* were received from Andrew Halstead of the Royal Horticultural Society (RHS) at Wisley, who in turn had been sent the specimens from a private garden near Northwich in Cheshire. The leaves were taken from well-established conservatory-grown fig plants, that had in the course of the preceding five years developed scattered yellowish-green chlorotic blotches that were most obvious on the upper surfaces of the leaves. These symptoms are typical of infection with fig mosaic disease (FMD). Both the upper and lower surfaces of the leaves had a slight brown speckling, particularly in the chlorotic areas, symptoms associated with the presence of two species of mites. Twenty or so live specimens of a dark red tetranychid and several thousand live specimens of a pale yellow eriophyid were removed from the leaves, mainly from the lower surfaces.

The tetranychids were identified as *Panonychus ulmi* (Koch), a common polyphagous and cosmopolitan pest known from a variety of hosts in the British Isles, and the eriophyids were identified as *Aceria ficus* (Cotte), a host-specific pest of *Ficus carica* and a first record for the British Isles.

A sample of twenty-two *Ficus carica* leaves exhibiting similar symptoms to those seen in Cheshire was received at CSL on 26.x.00. These were taken from a nursery in West Sussex, off plants imported from Italy. Numerous dead specimens of the 'red spider mite' *Tetranychus urticae* Koch were found with over 30 live specimens of *Rhyncaphytoptus ficifoliae*, which like *A. ficus* is host-specific to *F. carica*, and is recorded in the British Isles for the first time.

Aceria ficus

Adult specimens of *Aceria ficus* are yellowish, slender, spindle-shaped mites, measuring 140–202 microns in length (Keifer *et al.*, 1982). This species was described from specimens collected in September 1917 from an unspecified species of fig growing wild in the small valley of Saint-André near Nice in France. At the time it was noted that large numbers of mites were present but they did not appear to be causing any damage to the host (Cotte, 1920).

Since 1920, *A. ficus* has been recorded from the following countries: Egypt, India, Iran, Israel, Italy, Japan, Mexico, South Africa, Turkey, and the United States (California, Florida and Oregon), invariably on *F. carica*. Many species of eriophyid mites have limited host ranges, and often, as in the case of *A. ficus*, are restricted to a single host species. It seems certain that the host from which Cotte describes *A. ficus*

was also *F. carica*. Jeppson, Keifer & Baker (1975) state that *A. ficus* 'ranges everywhere figs are grown'. Having searched a wide variety of reference sources, I have been unable to find records of this mite in countries other than those already listed. The specimens referred to here are therefore the first to be recorded in the British Isles.

The biology of *A. ficus* is described by Baker (1939) in some detail for populations occurring in California on outdoor-grown *F. carica*. In summary, the mites overwinter in and around the buds. When the buds begin to break they move out on to the developing foliage and start to lay eggs. The generation time given is between 20 and 28 days. A recent paper by Abou-Awad *et al.* (2000) gives a generation time of 17.9 days for populations of *A. ficus* in Egypt.

Under glass, feeding by this mite may completely prevent new growth. In addition to any physical damage it can cause through feeding injury, *A. ficus* is of economic importance as it is a proven vector of FMD (Frock & Wallace, 1955; Oldfield, 1970; Proseler, 1969 & 1972).

Apart from *F. carica* and *Cudrania tricuspidata* (Carr.) (which like *Ficus* is a member of the family Moraceae), FMD is known to affect at least 18 other *Ficus* species (Burnett, 1962; Blodgett & Gömeç, 1967). Symptoms of FMD in *F. carica* vary greatly in severity between different cultivars, from blotchy discoloration of the leaves and fruits to leaf distortion and in severe cases leaf and fruit drop (Condit & Horne, 1933). It has been clearly demonstrated that *A. ficus* is an efficient vector of FMD. A single infected mite is able to transmit the disease to an uninfected plant within 15 minutes of feeding commencing on the new host (Proeseler, 1969 & 1972). Although *A. ficus* is a vector of FMD, its host-specificity prevents it from spreading the disease to other *Ficus* species. The disease is most commonly spread unwittingly by vegetative propagation or by grafting (Blodgett & Gömeç, 1967).

The first published account of the disease in the British Isles is that of Ainsworth (1935) from the RHS research station at Cheshunt in Hertfordshire. This account also includes anecdotal evidence that the disease was known from Wisley and other localities on the mainland and also on Guernsey at least twenty years prior to this.

The material collected from Cheshire was originally sent for diagnosis of the FMD symptoms that had developed over a period of five years on well-established and previously healthy conservatory-grown fig plants. It is reported that during this period new fig plants had been introduced to the conservatory. The new plants were purchased from a nursery in Norfolk, which in turn had imported them from Italy. Since no symptoms or eriophyoid mites had been observed on the original plants prior to this, and no grafting had taken place between the old and new plants, it is assumed that the new plants were the source of the mites and the FMD.

Rhyncaphytoptus ficifoliae

Adults of *R. ficifoliae* differ from *A. ficus* in being light amber to brown in colour with an elongate fusiform and curved body that measures between 180–195 microns in length. This species was described from specimens collected in California (Keifer, 1939) and is also recorded from Chile, Egypt, India, Iran, Iraq, Madeira and Yugoslavia. Jeppson, Keifer & Baker (1975) state that *R. ficifoliae* 'undoubtedly occurs widely in the Mediterranean region'.

By habit *R. ficifoliae* is a vagrant eriophyid species, i.e. it is free-living on the surface of the host and does not induce the formation of galls or erinea. The biology of this species has been investigated by Al-Mallah & Mohammad (1989) in Iraq and by Abou-Awad *et al.* (2000) in Egypt. In summary, the adult females overwinter in bark crevices and under the milky layer formed at leaf scars. The females migrate to

the newly emergent leaves in March and April and begin to lay eggs (Iraq). The generation time is recorded as 14.61 days (Egypt).

Unlike *A. ficus*, *R. ficifoliae* is not a vector of FMD and is considered to be of no economic importance.

Discussion

It is possible that both *A. ficus* and *R. ficifoliae* are already more widespread under glass than current records suggest, as both species are very small and easily overlooked. International trade from countries where *A. ficus* and *R. ficifoliae* are endemic is undoubtedly the route by which these mites were first introduced into the British Isles.

The heavy infestation of *A. ficus* in Cheshire is being controlled with a combination of pesticide treatments and biological control agents, but no statutory action was taken against the interceptions of *R. ficifoliae*. The discovery of FMD on newly imported fig plants has led to the precautionary destruction at RHS Wisley of a newly acquired fig plant exhibiting similar symptoms.

Other than *A. ficus* and *R. ficifoliae*, two other species of eriophyid mites have been recorded on *F. carica* (Amrine & Stasny, 1994), namely the host-specific vagrants *Asetadiptacus emilae* Carmona (Carmona, 1970) described in Portugal and *Diptilomiopus ficus* Attiah (Attiah, 1967) described in Egypt. Neither species is known to be of economic importance nor has yet been found in the British Isles.

The finding of *A. ficus* and *R. ficifoliae* highlights the importance of the work done by the Plant Health and Seeds Inspectorate (PHSI). Monitoring of imported plants is essential in order to prevent further introductions of destructive non-native pests and diseases.

Several hundred alcohol-preserved specimens of *A. ficus* have been deposited in the collection of the Natural History Museum in London (Accession Number BMNH (E) 2000-170), and retained at CSL, together with slide preparations. Two slides of ten specimens of *R. ficifoliae* are retained at CSL.

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SHORT COMMUNICATION

Moths and paint – the case of the yellow subway.—Chawton underpass is a 30m long subway under the A31 between Winton Rd., Alton, and Chawton Village, North Hampshire (SU709379). I have regularly passed through the tunnel over the past 6 years. Until 2000 the walls were unpainted, rendered concrete which was dirty grey in colour, but in early 2000 it was painted with a bright, shiny yellow pigment.

The underpass is lit both by day and night, and between 1994–2000 the lights attracted large numbers of moths, craneflies and other insects, which settled by day on the walls. These were found along the full length of the tunnel, but were most numerous towards the open ends. I recorded many species of moths including; *Geometra papilionaria* L., *Ligdia adustata* D. & S., *Selenia dentaria* F., *Crocallis elingnaria* L., *Colotois pennaria* L., *Peribatodes rhomboidaria* D. & S., *Ectropis bistortata* Goeze, *Theria primaria* Haworth, *Laothoe populi* L., *Orthosia incerta* Hufnagel, *O. gothica* L., *Colocasia coryli* L. plus various other plumes and pyralids. Since the paint was applied the only moths found resting on the walls have been two *Opisthograptis luteolata* in July 2001, one *Enpithecia centaureata* D. & S. in early August, and a single *Hepialus sylvina* L. on 24.viii.2001. *O. luteolata* was regularly found on the unpainted walls, but matches the new colour well.

I do not know if the paint has some sort of insect repellent added, but this seems unlikely, as it was obviously intended to make the tunnel brighter for pedestrians. The paint job has certainly had a knock-on benefit for insects, which are no longer trapped, although an *Aeshna cyanea* (Odonata: Aeshnidae) was rescued on 24.viii.01, with little prospect of escape as it was caught up in a spider's web at the middle of the tunnel. Presumably moths still come to the lights but are reluctant to settle and pass back out of the tunnel in search of a more suitable substrate on which to alight. This behaviour would seem to suggest that the increase in daylight at the tunnel openings must be sufficient to overcome the attraction of the lights and acts as a trigger to draw the moths away. J. S. DENTON, 2 Sandown Close, Alton, Hants GU34 2TG.